

Claus-Peter Richter, M.D., Ph.D.

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Current positions:

Assistant Professor at the Feinberg Medical School at Northwestern University in the Department of Otolaryngology- Head and Neck Surgery, Director of Resident Research, and Fellow of the Hugh Knowles Center for Clinical Basic Sciences in Hearing and its Disorders

Education:

--- **Habilitation** and Privatdozent, Department of Physiology, Johann Wolfgang Goethe-Universität, Frankfurt/Main (Germany), Habilitationsschrift: "The role of ion channels in bird hair cells for the encoding of acoustic information."

--- **Dissertation**, Department of Physiology, Johann Wolfgang Goethe-Universität, Frankfurt/Main (Germany), Thesis: "Cochlear function in birds after long term pre-hatch exposure to tones?"

--- Physics at the Johann Wolfgang Goethe-Universität, Frankfurt/Main (Germany) finished with the **Diplom** in Biophysics. Thesis: "Pearl chain formation in the alternating electric field".

--- **Approbation**

--- Medicine at the Johann Wolfgang Goethe-Universität, Frankfurt/Main (Germany). **Temporary Approbation** to practice medicine in Germany.

--- Electrical-engineering at the Friedrich-Alexander-Universität, Erlangen.

(The degrees have been reviewed by the bureau of the provost at Northwestern University and the following correspondences have been established: Physikum = 1st board exam, Vordiplom = B.S., Approbation = medical license, Diplom= M.S., Dissertation=M.D., and Habilitation = Ph.D.).

Languages:

German	Native language
English	Fluent speaking, reading and writing
French	Fluent speaking, reading and writing

Professional experience and achievements:

1990 My clinical medical training included the Arzt im Praktikum, which I completed at the Center of Physiology at the Medical School of the Johann Wolfgang Goethe-Universität (Frankfurt/Main, Germany). At the same time, I started basic research on neuronal encoding of acoustical information in the inner ear. I developed a novel method to apply drugs into the intact inner ear and to simultaneously monitor the effects of various chemicals on hearing capabilities.

Training: In collaboration with the Ear-Nose and Throat (ENT) Department at the medical School I received thorough training in assessing cochlear function in humans, and in the follow up and of testing patients with cochlear implants.

1991-1996 I continued my basic research on neuronal coding of acoustical information by the inner ear. I secured funding from the --- and from the --- to develop a model of how acoustic information is coded by auditory nerve fibers. This work is part of my effort to model a neuronal speech code that can be used to design hearing aids and cochlear implants. My appointment as Wissenschaftlicher Assistent at the Center of Physiology also required teaching. I taught Physiology to second-year medical students.

Training: My training consisted in writing scientific manuscripts. Furthermore, I also became experienced in teaching and developing novel teaching material. Part of my training was to rewrite the curriculum for an existing seminar on visual physiology.

1997-1999 Supported by a Fellowship provided by ---, I moved to Evanston, Illinois (U.S.A.) to learn new experimental techniques in the laboratory of ---. I learned to record from isolated cochlear cells and improved significantly my skills in animal surgery. Furthermore, I significantly contributed to the development of a novel technique, the half cochlea or hemicochlea, which allows for the first time visualization of the micromechanics of the inner ear. As a Research Associate in the Department of Communication Sciences and Disorders at Northwestern University I was able to secure research funding from the ---.

Training: I learned object-oriented computer programming and assembled a completely new experimental setup to record micromechanics of structures of the inner ear using a

photomultiplier and fluorescent beads. Furthermore, I familiarized myself with the concept of self-mixing laser diodes and how those devices could be applied to measure displacements in the nanometer range.

- 1999-2002 After having secured research money in two consecutive years for the project "Anatomy of the inner hair cell stereocilia-tectorial membrane complex and its micromechanics", I was appointed as Research Assistant Professor in the Department of Communication Sciences and Disorders at Northwestern University. Furthermore, I received three years funding from the ---.
- 2000-present I was appointed as a Fellow of the Hugh Knowles Center for Clinical and Basic Sciences in Hearing and its Disorders. I expanded my research to the study of electrical stimulation in the cochlea. With a novel hemicochlea preparation, I am examining the potential distribution and current spread produced by cochlear implants in cochlear tissues. These data may be important for understanding the electrode-tissue interface in cochlear implants.
- 2004-present I was appointed to serve as a consultant to the Ear, Nose and Throat Devices Panel of the Medical Devices Advisory Committee, Center for Devices and Radiological Health, Food and Drug Administration.

Current Collaborations:

---. We are examining the effects of the chemical Adenin-Tri-Phosphate (ATP) on cochlear function. The goal of the experiments is to determine whether ATP contributes to hearing loss by measuring stiffness of isolated cochlear cells.

Dr. Richard Chadwick, NIDCD/NIH Auditory Mechanic Section, NIH Building 9, Room 1E116, 9 Center Drive, MSC0922, Bethesda, MD 20982-0922. A novel mathematical approach is being developed to determine vibration patterns from a sequence of images captured from a cochlear cross section while a mechanical stimulus is applied to the tissue.

---. We are developing a real, three-dimensional finite-element model of the cochlea that will describe the peripheral processing of sound signals by the inner ear. Using the hemicochlea preparation, the micromechanical

properties of the mammalian inner ear are evaluated directly and used as parameters for the model. In addition, the hemicochlea is used to study and model the effects of electrical stimulation on the sensory and neural structures of the inner ear, as well as to describe the electroanatomy of the electrically stimulated cochlea.

---. We have developed a novel method for calibration of high frequency sounds. Sound calibrations were performed in a real head coupler up to 50 kHz. The method is being applied to assess hearing function in different strains of genetically manipulated mice.

---. This research is asking the questions: (1) which part of the auditory nerve fiber is activated by electrical stimulation from cochlear prostheses, and which type of stimuli are the most effective to elicit action potentials on the auditory nerve fiber, (2) which electrode-placement and stimulus waveforms maximize responses in spiral ganglion cells. It is already evident that a different placement of the reference electrode will significantly increase spatial separation and decrease the current required to activate neuronal tissue.

---. This research project examines the possibility to use light to stimulate spiral ganglion cells. This technology could lead to novel more powerful cochlear implant devices.

Honors and Awards:

2004-2005	---(PI), Current distribution in the electrically stimulated cochlea
2004-2007	---(PI), Micromechanics of the mammalian cochlea (IBN-0415901).
2005	---(Co-PI), Electrical olfactory responses after axotomy in mice.
2005-2006	---(Co-PI), Intracochlear measurements of implant electrode current pathways
2003-2004	--- (PI), Reduction of current shunt in cochlear prosthesis electrodes.
2000-2004	--- (PI), Micromechanics of the mammalian cochlea (IBN-0077476).
2001	--- (PI), Basilar membrane mechanics in the bird.
1998-2000	--- (PI), Anatomy of the inner hair cell stereocilia-tectorial membrane complex and its micromechanics.
1996-1997	--- (PI) (Fellowship Ri 699/5), Die Aufgabe von Ionenkanälen bei der Transduktion von Information und der Ionenverteilung im Innenohr (The function of ion channels on the encoding of acoustical information in the inner

- ear and the influence of ion channels on ion distribution within the cochlea).
- 1994 **---(PI)** Award, Interaktion von Haarzellen im Innenohr bei der Kodierung von Schallreizen (Interaction between cochlear hair cells during the encoding of acoustical signals).
- 1993-1996 **---(PI)** (grant Ri 699/3), Der Einfluß von Kanalmodulatoren auf den Transduktionsprozess im Innenohr (The influence of ion channel modulators on cochlear function).
- 1988-1990 **---(PI)**, Max-Planck-Institute for Biophysics, Frankfurt/Main (Germany).

Pending Support:

- 2004 **NIH (PI):** Current Flow determined by cochlear impedances (submitted: February 1st, 2004).
- 2004 **NIH (PI):** Laser stimulation: a novel concept for cochlear implants. (submitted: October, 1st, 2004)

Membership in Scientific Organisations

Association for Research in Otolaryngology (ARO)
 Ad Hoc Committee for the educational web site”
 Deutsche Physiologische Gesellschaft

Academic Responsibilities:

- 1992-1995 elected member of the administrative board of the Department of Physiology of the Medical School of the Johann Wolfgang Goethe-Universität at Frankfurt/Main.
- 1994-1995 elected member of the educational board of the Johann Wolfgang Goethe-Universität at Frankfurt/Main.
- 2003-present Faculty of the Graduate School at Northwestern University and the MSTP program
- 2003-present Member of the Galter Health Science Library Committee
- 2003-present Program Committee Member of the Medical Student Summer Research Program (MSSRP)
- 2004-present Member of the Animal Care and Use Committee

Teaching

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| 2005 | Lecture on “Neue Technologien bei Cochlea Implantaten” at the Association of Physicians at Hamburg (April 12, 2005). |
| 2005 | Lecture on “Challenges in cochlear implants” at Northwestern University Feinberg School of Medicine, Department of Otolaryngology Head and Neck Surgery (March, 31, 2005) |
| 2004 | Lecture on Cochlear implant electrodes at Northwestern University Department of Communication Sciences and Disorders (December, 2004). |
| 2003 | Lectures on “New Frontiers in Cochlear Research” and “Cochlear Implants: challenges and recent improvements” |
| 2002 | Lecture “New Frontiers in hair cell Research” |
| 2002 | I taught Physiology in the Medical School of the Johann Wolfgang Goethe-Universität at Frankfurt/Main. |
| 2000-2001 | Lecture “Introduction to Genetics” |
| 1990-1995 | I supervised students enrolled in a MD./PhD. Program, and students completing their Masters in Physics. |
| 1990-1995 | I taught Physiology in the Medical School of the Johann Wolfgang Goethe-Universität at Frankfurt/Main. |
| 1988-1990 | At the Max-Planck-Institute for Biophysics (Frankfurt/Main, Germany), I participated in the teaching of students enrolled in physics with a major in Biophysics. |
| 1985-1988 | Teaching assistant at the Johann Wolfgang Goethe-Universität Frankfurt/Main (Germany). |

Outside Interests:

Publications

Journals:

1. Meyer, H., Ditzinger, G., Knoblauch, P. and **Richter, C.-P.** (1992) Fewerfew - ein neues Phytopharmakon zur Behandlung der Migräne. PZ 19, 26-32.
2. Shehata-Dieler, W.E., **Richter, C.-P.**, Dieler, R. and Klinke, R. (1994) Effects of endolymphatic and perilymphatic application of salicylate in pigeon. I: Single fibre activities and cochlear potentials. Hear. Res. 74, 77-84.

3. Dieler, R., Shehata-Dieler, W.E., **Richter, C.-P.** and Klinke, R. (1994) Effects of endolymphatic and perilymphatic application of salicylate in the pigeon. II: Fine structure of auditory hair cells. *Hear. Res.* 74, 85-98.
4. Klinke, R., Müller, M., **Richter, C.-P.** and Smolders, J. (1994) Preferred intervals in bird and mammals, a filter response to noise? *Hear. Res.* 74, 238-246.
5. **Richter, C.-P.** and Klinke, R. (1994) Artifact-free application of drugs into the avian endolymphatic space. *Journal of Neuroscience Methods* 51, 171-175.
6. Knoblauch, P., Ptak, M., Schönweiler, R., **Richter, C.-P.**, Denzel, K., Hofmann, A. and Meyer, H. (1994) Die Wegrauke, das Kraut der Sänger. *PZ* 32, Jg.139, 2546-2551.
7. **Richter, C.-P.**, Heynert, S. and Klinke, R. (1995) Rate-intensity functions of pigeon auditory primary afferents. *Hear. Res.* 83, 19-25.
8. **Richter, C.-P.**, Sauer, G., Hoidis, S. and Klinke, R. (1996) Development of activity patterns in auditory nerve fibres of pigeons. *Hear. Res.* 95, 77-86.
9. **Richter, C.-P.**, Heynert, S. and Klinke, R. (1996) Effects of streptomycin and amiloride on the function of the pigeon inner ear. *J. Comp. Physiol. A* 179/3, 415-427.
10. Meyer, H., Steppkes, R., Roth R. und **Richter, C.-P.** (1996) Mistelextrakte zur Immunmodulation bei Tumorpatienten. *PZ* 27, 2483-2493.
11. Joeken, S., Schwegler, H. and **Richter, C.-P.** (1997) Modeling stochastic spike train responses of neurons: An extended Wiener series analysis of pigeon auditory nerve fibers. *Biological Cybernetics* 76 (2): 153-162.
12. **Richter, C.-P.**, Evans, B.N. Edge R. and Dallos P. (1998) Basilar membrane vibration in the gerbil hemicochlea. *J. Neurophys.* Vol. 59 No. 5, 2255-2264.
13. Edge, R.M., Evans, B.N., Pearce, M., **Richter, C.-P.**, Hu, X. and Dallos, P. (1998) Morphology of the unfixed cochlea. *Hear. Res.* 124, 1-16.
14. Sauer, G., **Richter, C.-P.** and Klinke, R. (1999) Pigeon Na⁺, K⁺, Ca⁺⁺ and Cl⁻ concentrations in pigeon perilymph and endolymph. *Hear. Res.* 129, 1-6.
15. **Richter, C.-P.**, Edge, R.M., He, D.Z. and Dallos, P. (2000) Development of the gerbil inner ear observed in the hemicochlea. *JARO* 1, 195-210.
16. Pearce, M., **Richter, C.-P.** and Cheatham, M.A. (2001) A reconsideration of sound calibration in the mouse. *J. Neurosci. Methods* 106, 57-67.

17. Cheatham, M.A., Pearce, M., **Richter, C.-P.**, Onodera, K. and Shavit, J.A., (2001) Use of the pinna reflex as a test of hearing in mutant mice. *Audiol. Neurotol.* 6, 79-86.
18. Keiler, S. and **Richter, C.-P.** (2001) Cochlear dimensions obtained in hemicochleae of four different strains of mice: CBA/CaJ, 129/CD1, 129SvEv and C57BL/6J. *Hear. Res.* 162, 91-104.
19. Overstreet, E.H, **Richter, C.-P.**, Temchin, A.N., Cheatham, M.A. and Ruggero, M.A. High-frequency sensitivity of the mature gerbil cochlea and its development. (2003) *Audiol. Neurotol.* 8, 19-27.
20. Cai, H., **Richter, C.-P.** and Chadwick, R.S. (2003) Motion analysis in the hemicochlea. *Biophysical Journal* 85(3), 1929-37.
21. Zheng, J., **Richter, C.-P.** and Cheatham, M.A. (2003) Prestin expression in the reeler mouse. *J. Neuroscience Letter* 347,13-16.
22. Emadi, G., **Richter, C.-P.** and Dallos, P. (2004) Stiffness of the gerbil basilar membrane: radial and longitudinal variations. *J. Neurophysiology* 91, 474-488.
23. Ho, S.Y., R.J. Wiet and **Richter, C.-P.** (2004) Modifying cochlear implant design: advantages of placing a return electrode in the modiolus. *Otology & Neurotolgy* 25, 497-503.
24. **Richter, C.P.** (2004) Cochlear Implants: Fundamentals and Applications by G. Clark (invited book review) *Physics Today* 11, 66-67.
25. Rau, C., Peterson, K.M., Jemian, P.R., Terry, T., Harris, M, Vogt, S., **Richter, C.-P.**, Neuhausler, U., Schneider, G., Robinson, I.K. (2004) The evolution of hard x-ray tomography from the micrometer to the nanometer length scale. *Proc SPIE Vol. 5535*, 709-714.
26. --- (submitted).
27. --- (submitted).
28. --- (submitted).
29. --- (submitted).

Patent applications

1. Cochlear implant including a modiolar return electrode. Inventors: Steven Ho and **Claus-Peter Richter** NU22087
2. Optical stimulation of the auditory nerve, a novel concept for cochlear implants. Inventors: Jay Walsh, Jr., Agnella Izzo, Duco Jansen and **Claus-Peter Richter** NU25001.

Invited oral presentations / lectures:

1. Physiologie des Hörens. V. Winterschule der Deutschen Gesellschaft für Medizinische Physik, Pichl (Austria), 25.-29.1.1993.
2. Nichtlineare Cochlear Mechanik. Seminar des Instituts für Theoretische Physik (Prof. Theo Geisel), Frankfurt (Germany), 8.9.1993.
3. Vergleichende Betrachtungen zur Funktion des Hörorgans bei Vögeln und Säugetieren. Interdisziplinärer Workshop Bioakustik "Numerische Methoden zur Lautäußerung bei Tier und Mensch", Nauendorf (Germany), 7-8.11.1994.
4. Steuerungsmechanismen des menschlichen Körpers - wie lassen sich ganzheitsmedizinische Behandlungsmöglichkeiten erklären? Mutlangen (Germany), 12.12.1995.
5. Neuronal encoding at the inner hair cell afferent. Göttinger Neurobiologentagung, Neurobiology from Membrane to Mind, Göttingen (Germany), 22.-25.5.1997.
6. Basal cochlear development in the gerbil. Seminar des Sonderforschungsbereichs 269, Frankfurt/Main, 5. April 2000.
7. Basal cochlear development in the gerbil. Seminar des Anatomischen Instituts der Universität Ulm, Ulm, 10. April 2000.
8. Micromechanics in the mammalian cochlea, Kresge Hearing Institute, Ann Arbor, MI, 16. January 2002.
9. Micromechanics in the mammalian cochlea (Audiology Japan), 3^d - 4th October 2002, Japan.
10. New Frontiers in cochlear research (Multidisciplinary Management of Ear Disease), 8th-9th, August, 2003, Tacoma.
11. Cochlear Implants: Challenges and recent developments (Multidisciplinary Management of Ear Disease), 8th-9th, August, 2003, Tacoma.
12. Electroanatomy of the mammalian cochlea, 2nd December, 2003, NIH Bethesda.

Book chapters and abstracts:

1. **Richter, C.-P.** and Klinke, R. (1991) The effect of high concentration sodium and potassium solutions in the scala media on pigeon primary afferents. In: N. Elsner and H. Penzlin. (Eds.), Synapse-Transmission-Modulation, Thieme Verlag, Stuttgart, 104.
2. **Richter, C.-P.**, Voßieck, T. and Klinke, R. (1991) Influence of a channel blocker (TEA) on inner ear transduction in the pigeon. 28th Workshop on Inner Ear Biology (Abstract)
3. Daubitz, E., **Richter, C.-P.**, Shehata-Dieler, W.E., Voßieck, T. and Klinke, R. (1992) Effects of 4-aminopyridin (4-AP) and caesium (Cs) applied into the scala media on single fibre activities in the pigeon cochlear ganglion. In: N. Elsner and W. Richter. (Eds.), Rhythmogenesis in neurons and networks, Thieme Verlag, Stuttgart, 24.
4. **Richter, C.-P.**, Voßieck, T. and Klinke, R. (1992) Time structure in spike trains of auditory neurones with pink noise stimulation. In: N. Elsner and W. Richter. (Eds.), Rhythmogenesis in neurons and networks, Thieme Verlag, Stuttgart, 24.
5. Klinke, R., **Richter, C.-P.** and Voßieck, T. (1992) Frühe Veränderungen des Transduktionsprozesses nach intracochleärer Gabe von Streptomycin. Archives of Oto-Rhino-Laryngology Supplement, (Abstract)
6. Klinke, R., **Richter, C.-P.** and Voßieck, T. (1992) Frühe Veränderungen des Transduktionsprozesses nach intracochleärer Gabe von Streptomycin. HNO Informationen 1, 92. (Abstract)
7. **Richter, C.-P.** and Klinke, R. (1992) Properties of spontaneous activities in pigeon primary afferents. 29th Workshop on Inner Ear Biology (Abstract)
8. Shehata-Dieler, W.E., **Richter, C.-P.**, Dieler, R. and Klinke, R. (1992) Effects of salicylate on the pigeon basilar papilla. 29th Workshop on Inner Ear Biology (Abstract)
9. **Richter, C.-P.**, Heynert, S. and Klinke, R. (1993) Non-linearities in neuronal I/O-functions of pigeon auditory nerve fibres. In: N. Elsner and M. Heisenberg. (Eds.), Gene-Brain-Behaviour, Thieme Verlag, Stuttgart, 238.
10. Heynert, S., **Richter, C.-P.** and Klinke, R. (1993) Effects of amiloride on the mechano-electrical transduction process in the inner ear of pigeon. In: N. Elsner and M. Heisenberg. (Eds.), Gene-Brain-Behaviour, Thieme Verlag, Stuttgart, 239.

11. Dieler, R., Shehata-Dieler, W.E., **Richter, C.-P.** and Klinke, R. (1993) The fine structure of pigeon auditory hair cells is altered by salicylate application. Assoc. Res. Otolaryngol. 16, 347. (Abstract)
12. Klinke, R., **Richter, C.-P.**, Müller, M. and Smolders, J. (1993) Evoked preferred intervals in pigeon. Assoc. Res. Otolaryngol. 16, 134. (Abstract)
13. Klinke, R., **Richter, C.-P.** and Heynert, S. (1993) Non-linearities in neuronal I/O-functions of pigeon auditory nerve fibres. Meeting of Physiology Glasgow (Abstract)
14. **Richter, C.-P.**, Heynert, S. and Klinke, R. (1993) Rate-intensity-functions of pigeon auditory nerve fibres show non-linearities. 30th Workshop on Inner Ear Biology (Abstract)
15. **Richter, C.-P.** and Klinke, R. (1993) The effects of TEA and Cs on filter properties in pigeon auditory single fibres. Assoc. Res. Otolaryngol. 16, 374. (Abstract)
16. Shehata-Dieler, W.E., **Richter, C.-P.**, Dieler, R. and Klinke, R. (1993) Endolymphatic and perilymphatic application of salicylates affects CAP and single fibre thresholds in the pigeon. Assoc. Res. Otolaryngol. 16, 556. (Abstract)
17. Kluge, M., **Richter, C.-P.**, Sauer, G. and Klinke, R. (1994) Correlation of activity between auditory nerve fibres recorded simultaneously. 31th Workshop on Inner Ear Biology (Abstract)
18. **Richter, C.-P.**, Heynert, S. and Klinke, R. (1994) Rate-intensity functions of pigeons primary afferents obtained from stimulation at, below and above characteristic frequencies. Assoc. Res. Otolaryngol. 17, 489. (Abstract)
19. **Richter, C.-P.**, Heynert, S. and Klinke, R. (1994) Streptomycin and amiloride applied into the pigeon scala media affect the mechano-electrical transduction. 31th Workshop on Inner Ear Biology (Abstract)
20. **Richter, C.-P.**, Sauer, G. and Klinke, R. (1994) Histological and physiological effects of an increased calcium concentration in pigeon scala media. Assoc. Res. Otolaryngol. 18, 134. (Abstract)
21. Kluge, M., **Richter, C.-P.** and Klinke, R. (1995) Correlation of activity between avian auditory nerve fibres recorded simultaneously. In: N. Elsner and H. Breer (Eds.), Thieme Verlag, Stuttgart, 291.
22. **Richter, C.-P.**, Heynert, S. and Klinke, R. (1995) In vivo effects of streptomycin and amiloride on the mechano-electrical transduction in pigeon auditory hair cells. In: N. Elsner and H. Breer. (Eds.), Sensory Transduction, Thieme Verlag, Stuttgart, 72.

23. **Richter, C.-P.**, Sauer, G. and Klinke, R. (1995) Maturation of fundamental activity patterns of pigeon auditory nerve fibres. In: N. Elsner and H. Breer. (Eds.), Thieme Verlag , Stuttgart, 292.
24. Kluge, M., **Richter, C.-P.** and Klinke, R. (1995) Activity in primary auditory afferents: Is there a correlation? Physiologenkongress, Münster (Abstract)
25. **Richter, C.-P.**, Sauer, G. and Klinke, R. (1995) Effects of an increased calcium concentration in pigeon scala media on cochlear function. Physiologenkongress, Münster (Abstract)
26. Sauer, G., **Richter, C.-P.** and Klinke, R. (1995) Concentrations of potassium, sodium and chloride in pigeon scala media and scala tympani. Physiologenkongress, Münster (Abstract)
27. Kluge, M., **Richter, C.-P.** and Klinke, R. (1995) Spontaneous activity of avian auditory nerve fibres - a renewal process? 32th Workshop on Inner Ear Biology (Abstract)
28. **Richter, C.-P.**, Sauer, G. and Klinke R. (1995) Fundamental activity patterns of pigeon auditory nerve fibres in immature and adult animals. 32th Workshop on Inner Ear Biology.
29. **Richter, C.-P.**, Sauer, G. and Klinke R. (1996) Pigeon endocochlear potential explained by peri- and endolymphatic potassium, sodium, chloride and calcium concentration. Abstr. Assoc. Res. Otolaryngol. 19, (Abstract)
30. Sauer, G., Klinke, R. and **Richter, C.-P.** (1996) Concentrations of Na^+ , K^+ , Ca^{++} and Cl^- in the pigeon inner ear and the permeabilities of the endolymph-perilymph-barrier. Physiologenkongreß, Zürich (Abstract)
31. Kluge, M., **Richter, C.-P.** and Klinke, R. (1996) Spontaneous activities of avian auditory nerve fibres modelled by a Hidden Markov Model. Physiologenkongreß Zürich (Abstract)
32. Klinke, R., Sauer, G. and **Richter, C.-P.** (1996) Einfluß der Ionenverteilung auf das endocochleäre Potential des Vogels. Archives of Oto-Rhino-Laryngology, Supplement (Abstract)
33. **Richter, C.-P.**, Kluge, M., Klinke, R., Joeken S. (1996) Pigeon spontaneous activities - a renewal process? In: Diversity in Auditory Mechanics. Ed. E.R. Lewis et al., World Scientific Publishing Co. Pte. Ltd., Singapore.
34. **Richter, C.-P.**, Evans, B.N., Edge, R. and Dallos P. (1997) Basilar membrane mechanics in the gerbil hemi-cochlea. Abstr. Assoc. Res. Otolaryngol. 20, (Abstract).

35. **Richter, C.-P.**, Evans, B.N., Vranic-Sowers, S. and Dallos P. (1997) Absolute time delays in motile response of guinea pig outer hair cells. Abstr. Assoc. Res. Otolaryngol. 20, (Abstract).
36. **Richter, C.P.** (1997) Neuronal encoding at the inner hair cell afferent. In: N. Elsner. and H. Wässle (Eds.), Thieme Verlag , Stuttgart, 17.
37. **Richter, C.-P.**, Evans, B.N., Edge R., Pearce, M. and Dallos P. (1998) Are inner hair cell stereocilia attached to Hensen's stripe? Abstr. Assoc. Res. Otolaryngol. 21, (Abstract).
38. **Richter, C.-P.**, Evans, B.N., Hu, X. and Dallos P. (1998) Basilar membrane micro-mechanics measured in the gerbil inner ear Abstr. Assoc. Res. Otolaryngol. 21, (Abstract).
39. Edge, R., He, D. Z., **Richter, C.-P.**, Evans, B.N., Pearce, M. and Dallos P. (1998) Development of the gerbil inner ear from day 0 to mature Abstr. Assoc. Res. Otolaryngol. 21, (Abstract).
40. **Richter, C.-P.** and Dallos, P. (1998) Basilar membrane micromechanics measured in the gerbil inner ear. 35th Workshop on Inner Ear Biology (Abstract).
41. **Richter, C.-P.** and Dallos, P. (1999) Vibrations of the inner hair cell stereocilia relative to the tectorial membrane and the reticular lamina. Abstr. Assoc. Res. Otolaryngol. 22, (Abstract).
42. Vujanovic, I., **Richter, C.-P.** and Dallos, P. (1999) Electrically induced micro mechanical vibration in the gerbil hemicochlea. Abstr. Assoc. Res. Otolaryngol. 22, (Abstract).
43. Emadi, G., **Richter, C.-P.** and Dallos, P. (1999) Stiffness measurements in the gerbil hemicochlea. Abstr. Assoc. Res. Otolaryngol. 22, (Abstract).
44. Dallos, P. and **Richter, C.-P.** (1999) Cochlear neurobiology: The state of micromechanics. Danvox Symposium (Copenhagen).
45. **Richter, C.-P.** and Dallos, P. (2000) Micromechanics contribute to the shift in the frequency place code in developing gerbils. Abstr. Assoc. Res. Otolaryngol. 23, (Abstract).
46. Vujanovic, I., **Richter, C.-P.** and Dallos, P. (2000) Electrically induced movements of OHCs in the gerbil hemicochlea. Abstr. Assoc. Res. Otolaryngol. 23, (Abstract).
47. Ostrowski, V., **Richter, C.-P.** and Dallos P. (2000) Effect of Leukotriene D4 and Ethanol on cochlear potentials. Abstr. Assoc. Res. Otolaryngol. 23, (Abstract).

48. Cheatham, M.A., Pearce, M., **Richter, C.-P.**, Onodera, K., Shavit, J.A., and Engel, J.D. (2000) Beware the use of the pinna reflex as a test of hearing acuity in mutant mice. Abstr. Assoc. Res. Otolaryngol. 23, (Abstract).
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